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ABSTRACT

Reported is the development of instructional procedures to teach learning disabled and mentally handicapped children reading skills, based on their particular verbal learning and language characteristics. Focused on is the development of prototypes of teaching procedures based on cross connecting the learning, language, and reading domains. Detailed are the following steps of prototype development: specifying a behaviorally stated instructional objective for the reading skill, identifying the aspect of learning or language involved in the instructional objective, identifying the independent variables which influence that aspect of learning or language, and expressing variants of the independent variables as teaching procedures. It is explained that prototypes have been developed for teaching the following 13 reading skills: identifying main ideas and supporting ideas, identifying word meanings from context, learning word meanings--synonyms, learning word meanings--homonyms, learning word meanings--concepts, learning sight vocabulary, learning word meanings--compounds, learning word meanings--affixes, recalling and comprehending sentences, learning through sentences, learning through connected discourse, directions, and identifying main ideas and supporting ideas in connected discourse. (Author/DB)

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Symposium: Teaching Selected Reading Skills to Learning Disabled Children

Overview of the Georgia Reading Research Program: Special Reading Instructional Procedures for Mentally Retarded and Learning Disabled Children[1]

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Overview of the Georgia Reading Research Program: Special Reading Instructional Procedures for Mentally Retarded and Learning Disabled Children[1]

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University of Georgia

The purpose of this presentation is to summarize briefly the problem and procedures for the research program, Special Reading Instructional Procedures for Mentally Retarded and Learning Disabled Children. Many procedural steps and activities have been necessary in carrying out the research program; thus, this summary is highly capsulated. A complex technical description is necessary to present sufficient specificity about the nature of the activities and the rationale for choosing them. In the prospectus for the program, the procedures and rationale are described fully. For those interested, the complete program prospectus is available from the program directors or from ERIC.

Problem

The Goal and End-product

Our goal is to produce reading instructional techniques which are adapted to the two target groups' particular verbal learning and language characteristics. The target groups are children who are mentally retarded and children who are learning disabled. My remarks today will be limited to our research program dealing with learning disabilities although the rationale and procedures will apply similarily to our research program with the mentally retarded.

Our end-product is what we call Sourcebooks. A Sourcebook is a compendium of information about the special procedures which we find to be effective in teaching the reading skills. Each Sourcebook will contain two parts: a set of

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elements which will present the special teaching techniques for the reading skills and a set of operator rules which will present principles and methods for selecting and using the special techniques for particular purposes and then evaluating and replanning. The Sourcebooks will be reference books for teachers and others who develop or select instructional systems for teaching reading.

Dimensions of the Problem

We are doing instructional design work in special education. Making educational adaptations for individual differences involves a basic value orientation and a basic concept. The basic concept concerns the notion of interaction--specifically that variations among pupils in a situation are a function of interrelations between the characteristics of the pupils and the characteristics of the situation. The value orientation is that we adjust the situation to the pupil rather than the pupil to the situation. As a result of this interaction, we are basing the type of adaptations on the interactions between certain characteristics of the learning disabled pupils and on the requirements of the reading instructional situation.

The kind of work we are doing means that we must identify what kinds of educational adaptations are made. More narrowly, it means identifying when adaptations are needed and when they are not. We are interested in diagnostics and placement; our main focus is on specific problem areas in the reading process and on specific treatments.

In other words, our goal is to adapt reading instruction based on the particular needs and verbal learning and language characteristics of a subset group of children with certain kinds of specific learning disabilities. These adaptations include appropriate variations in methods, materials, incentives, and conditions (timing, sequence, and organization) for teaching reading to these kind of children. What does this mean? In essence, it means that our approach is to apply knowledge and methodology in the behavioral sciences in

designing instructional procedures for learning disabled children. We are selecting and focusing relevant information from the sciences which contribute to pedagogy. This knowledge base includes research, theory, analysis, and training - based experiences in language and learning. This knowledge pertains to the nature of the reading skills, the nature of individual differences, the classes of behavior underlying reading, and current teaching and evaluation procedures. Thus, our purpose was to translate research on learning and language into reading instructional procedures for the learning disabled and to evaluate the effectiveness of these prototypes in controlled situations.

Procedure

In conducting the research program, we employed six categories to keep the activities mission-oriented from the origin-goal through the instructional design process to the target end-product. These categories are listed below:

Instructional Design Task	Subprogram/Project
1. Describe knowledge base	1.0 Codification of the knowledge base
2. Define scope of instruction	2.0 Codification of the reading skills 2.1 Specification of reading skills 2.2 Specification of target reading skills 2.3 Analysis of target reading skills 2.4 Specification of assessment procedures: Instrument development
3. Assess entering behavior	3.0 Organization of specifications and recommendations
4. Identify instructional procedures	4.0 Prototype design: procedures for teaching reading

5. Evaluate instructional procedures	5.0 Evaluation of procedures for teaching reading
6. Describe the output	6.0 Codification of sourcebooks 6.1 Codification of special techniques 6.2 Codification of operator packages: Principles and methods for selecting and using the special techniques

Blake (1973) has summarized the specific program activities. The following summary closely follows Blake.

Instructional Design Task 1: Describe Knowledge Base

The task of Subprogram 1.0 Codification of the Knowledge Base was to locate, index, and synthesize information about relevant research, theory, and practice for the selected independent and dependent variables and to route this information to all of the other subprograms.

Instructional Design Task 2: Define Scope of Instruction

The task was to specify the instructional objectives to be taught the pupils. Subprogram 2.0 Codification of the Reading Skills was devoted to this task. It involved precisely delimiting the reading skills, which were the dependent variables in all subsequent activities.

Specifying Reading Skills. Project 2.1, Specification of Reading Skills, was devoted to specifying the domain of reading skills on which we worked, i.e., to locating and organizing reading skills taught in the schools. We considered a range of reading skills, and decided to study those aspects of reading manifested in identifying, interpreting, and responding to messages presented in written form. Specific categories of skills are those taught in the school under the rubrics of comprehension and interpretation skills, word recognition skills, oral reading skills, and skills related to rate.

Specifying Target Reading Skills. In Project 2.2, Specification of Target Reading Skills, we took the codified list of skills from Project 2.1, selected

reading skills which should be given priority in teaching, and ranked those skills on a priority dimension. Our selection criteria reflect joint consideration of three bases--the society, the learner, and the content area. That is, we took into account reading skills which pupils need to fulfill their current and prospective social roles, pupils' potentiality for learning these needed skills, and the additional reading skills which are prerequisite to pupils' learning these needed reading skills. We used judgmental procedures to apply the criteria in selecting and ranking the skills.

Analyzing the Target Reading Skills. Project 2.3, Analysis of Target Reading Skills, was devoted to describing the target skills selected in Project 2.2. These descriptions became the specific bases for selecting assessment procedures, assessing entering behavior, and developing and evaluating instructional procedures. These descriptions include the following.

1. The instructional objective: content elements, desired terminal performance, and conditions under which the performance should occur.
2. The immediate prerequisite skills which are entering behavior for a target skill.
3. Response measures for the target reading skills and the prerequisite skills.
4. Criteria for mastery, or sufficient attainment, of the target reading skills and the prerequisite skills.

Specifying Assessment Procedures. In Project 2.4, Specification of Assessment Procedures: Instrument Development, we were concerned with selecting or developing assessment procedures for the target reading skills analyzed in Project 2.3.

Instructional Design Task 3: Assess Entering Behavior

The instructional design task was to assess pupils' initial status for the instructional objectives and to specify instructional needs on the basis of the discrepancy between pupils' initial status and the requirements of the instructional objectives. Subprogram 3.0, Organization of Specifications and

Recommendations, was devoted to this task. We used information from Projects 2.3 and 2.4 to obtain data in Subprogram 3.0. In turn, we used these data for recommendations for needed actions.

Instructional Design Task 4: Identify Instructional Procedures

The task was to use relevant information in identifying instructional procedures appropriate for facilitating pupils' attainment of the instructional objectives. Subprogram 4.0, Prototype Design: Procedures for Teaching Reading, was devoted to identifying techniques specified as needed in Project 3.0. Relevant information pertains to the attributes of the reading skills and their underlying components, and to the characteristics of the pupils. We used this information in making appropriate adaptations. This development process involved four steps.

1. Doing a component analysis to identify the types of behavior involved in the instructional objectives.
2. Identifying variables which influence these types of behavior.
3. Selecting variables which should be optimum to influence the types of behavior and, thus, the attainment of the instructional objectives.
4. Describing these variables in terminology appropriate for the instructional objectives.

Instructional Design Task 5: Evaluate Instructional Procedures

The instructional design task was to evaluate the instructional procedures or treatments identified in Subprogram 4.0. Subprogram 5.0, Evaluation of Procedures for Teaching Reading, was devoted to this activity.

Instructional Design Task 6: Describe the Output

The task is to collect and organize appropriate outputs into the Sourcebooks about special procedures for teaching reading to the respective target groups. Subprogram 6.0, Codification of Sourcebooks, was designed to accomplish this task.

Formulating and Evaluating Instructional Prototypes

During the past three years we have conducted approximately 100 prototype

evaluation studies for the MR program and approximately 70 for the LD program. The dependent varibles were the reading skills. Table 1 shows the final set of skills which emerged over the three years.

Insert Table 1 about here

Different people delimit the reading domain in different ways. As you can see from Table 1, we chose the reading skills approach. Also, we selected target reading skills for priority attention because we had neither the time nor money to work with all of the skills listed in Table 1.

After identifying the skills, the next step was to analyze the target reading skills as to the behavior involved. The analysis is crucial because a key step in cross-connecting the reading domain to the learning and language domains is to identify the type of learning involved in the reading skill. The final result, our judgments about type of learning, are in parentheses in Table 1.

The independent variables were the teaching treatments or variants derived from codification of learning and language research (Project 1.0), which yielded the independent variables--those variables which influence various aspects of learning and language. These variables are shown in Table 2. Again, there is debate about the nature of learning and language and conditions which influence them. We opted for the McGeoch and Trion--Underwood--Gagne tradition.

Insert Table 2 about here

Remember, our purpose was to translate research on learning and language into reading instructional procedures and to evaluate the effectiveness of these instructional procedures with learning disabled and normal pupils.

We formulated prototypes of instructional procedures by cross-connecting the learning, language, and reading domains. The procedure involves these steps:

1. Describe the reading skill.
2. Specify the instructional objective.
3. Cross-connect the reading skill and the language/learning domain.
4. Identify the independent variables which influence the aspect of learning or language involved in the reading skill.

   --Specify intervening variables

   --Specify independent variables

5. Specify instructional procedures

After formulating our instructional variants (methods, procedures, techniques, materials) the next step was to evaluate the prototypes. We used this evaluation strategy. Given treatment procedures which should facilitate reading achievement, we designed evaluation studies for one of two problems: the relative effectiveness of two or more effective treatments; or the relative effectiveness of amounts of one effective treatment. Ultimately, given a set of effective treatments, we intend to find out the most effective amounts of all treatments and the most effective treatments among those in a set.

We evaluated each set of treatments in a separate study. For most studies, we used a treatments by groups by practice levels design. The treatments were teaching variants of the particular independent variables being investigated. The groups were learning disabled and non-learning disabled subjects. The practice levels, a repeated measure, were the multiple presentations of material. In each study, there were four practice levels or trials.

We used two elements of strategy to deal with generalizability. First, among studies, we used the same data collection plans, sampling plans and sizes, statistical procedures, and, as much as possible, task formats and procedures. The idea here was to try for conditions which would enable us to attribute differences among results to differences among variables, not to differences in study design. Lindquist Type III analysis of variance design was computed for most studies.

Second, when it was appropriate and possible to do so, we tried to use each instructional procedure with two or more reading skills. The idea here was to check whether the instructional procedure had similar effects on different reading skills.

Our next speaker, Dr. Wayne Jones, will describe the subject section procedures and the subject characteristics of both our LD and non-LD samples used in the evaluations. Other speakers in today's program will present summary results of some of our prototype evaluation studies for some of the reading skills. While all studies have been conducted and analyzed, results of all the studies are not available at the present time. However, all material will be published in monographs of the Journal of Research and Development in Education. The monograph describing Year 1 work is already out. The other two monographs will be published during 1975.

TABLE 1

DEPENDENT VARIABLES: READING SKILLS

A. Word Recognition
   1. Sight Vocabulary* (Discrimination Learning)
   2. Phonics (Concept Learning)
      a. phoneme--grapheme correspondences
      b. pronunciation principles*
      c. syllabication principles
      d. principles of accent
   3. Dictionary pronunciation symbols

B. Word Meaning
   1. Structural Analysis
      a. compounds* (Verbal Learning)
      b. affixes* (Concept Learning)
      c. rules for spelling changes
   2. Homonyms* (Discrimination Learning)
   3. Synonyms* (Verbal Learning)
   4. Concepts* (Concept Learning)
   5. Figurative language
   6. Context analysis* (Connected Discourse)

C. Comprehension and Interpretation Skills: Sentences
   1. Learning sentences (comprehension and recall)* (Connected Discourse)
   2. Learning from sentences* (Connected Discourse)

D. Comprehension and Interpretation Skills: Longer Selections
   1. Finding directly-stated main ideas* (Connected Discourse)
   2. Finding directly-stated supporting ideas* (Connected Discourse)
   3. Making inferences
   4. Drawing conclusions
   5. Finding relations
      a. cause-effect
      b. time relations
      c. spatial relations
      d. analogous relations
      e. size relations
      f. part-whole relations
      g. sequence relations
   6. Critical reading
      a. recognizing true and false information
      b. identifying pertinent and non-pertinent information
      c. identifying rhetorical devices (slanting, etc.)
      d. identifying missing information
      e. identifying fact and opinion
   7. Skimming and scanning
   8. Identifying impressions
      a. sensory images
      b. emotional tone
      c. character traits
   9. Using reading in problem solving
      a. pinning down purposes
      b. using previewing
      c. relating to graphs and charts
      d. taking notes
      e. making outlines
      f. checking relevance to other material and contexts
      g. synthesizing information from several sources

*Indicates the target skills with which we worked during the three years

TABLE 2

INDEPENDENT VARIABLES: VARIABLES WHICH INFLUENCE ASPECTS OF LEARNING AND LANGUAGE

I. Specific Conditions of Learning

A. Discrimination Learning
1. Relevant (distinctive) and Irrelevant Features**
2. Transformations*
3. Dimensionality of Stimuli
4. Contiguity**
5. Redundancy*
6. Word pronunciability*
7. Verbal mediation*
8. Stimulus familiarization*
9. Order of presentation*
10. Use of context*
11. Type of practice*

B. Concept Learning
1. Number of Rules*
2. Nature of Rules*
3. Rule Learning*
4. Attribute Learning*
5. Complete Learning*
6. Ratio-Relevant and Irrelevant Dimensions*
7. Ratio-Positive and Negative Instances*
8. Variety of Contexts**
9. Redundancy*
10. Response Dominance
11. Perceptibility
12. Taxonomic Level
13. Contiguity of Instances*
14. Simultaneous and Successive Presentation**
15. Degree of Relevance*

C. Verbal Learning
1. Meaningfulness
   a. Frequency**
   b. Association value**
   c. Familiarity
   d. Stimulus familiarization*
   e. Pronunciability**
   f. Sequential dependencies
   g. Vividness/Imagery
   h. Concreteness/Abstractness*
   i. Use of illustrations*
   j. Order of presentation*
2. Organization
   a. Coding*
   b. Mediation*
   c. Clustering
   d. Stimulus selection
   e. Context vs paired associates*
3. Intratask similarity
   a. Formal similarity*
   b. Meaningful similarity*
   c. Conceptual similarity*
   d. Associative similarity

TABLE 2 (continued)

4. Serial position
5. Form class**

D. Dealing with Connected Discourse: Words in Context
1. Type of context clues*
2. Explicitness of clues*
3. Amount of isolation*
4. Form classes*
5. Type of responses*
6. Clue format*

E. Dealing with Connected Discourse: Sentences
1. Instructional methods/transformations*
2. Type of transformation*
3. Completion sequence*
4. Type of embedding*
5. Concreteness/abstractness*
6. Number and position of embedded clauses
7. Type of prompt*
8. Placement of prompt*
9. Reduced relative clause transformations*
10. Semantically meaningful vocabulary*
11. Directionality of print*
12. Sentence complexity*
13. Word length*
14. Word meaningfulness*
15. Type of visual phrasing cues*
16. Color of phrasing cues*
17. Number of phrasing cues*
18. Sentence length*
19. Meaningfulness of material*
20. Order of presentation*
21. Semantic and syntactic negation*
22. Prefixal and sentence negation*
23. Explicitness of negation*
24. Instructions for inclusion or exclusion*

2. General Conditions of Acquisition
A. Instructions and intent: Acquisition
B. Whole and parts methods***
C. Distribution of practice***
D. Amount of material*******
E. Type of recitation**
F. Amount of recitation*
G. Amount of practice*****
H. Discovery and exposition**
I. Structure
J. Prompting/confirmation/study-test*
K. Mode of response*
L. Mode of presentation*
M. Item length*

TABLE 2 (continued)

N. Type of print*

O. Type of feedback*

P. Amount of feedback*

Q. Test type***

3. Retention Conditions
   A. Type of retention measure
      1. recognition
      2. recall
      3. relearning
      4. resistance to retroactive inhibition
   B. Instructions and intent: Retention
   C. Degree of original learning
   D. Conditions influencing retroactive inhibition
      1. similarity
      2. degree of original learning
      3. degree of interpolated learning
      4. distribution of practice
      5. number of interpolated tasks

4. Transfer Conditions
   A. Instructions and intent: Transfer
   B. Degree of original learning
   C. Similarity Relations
      1. stimulus similarity
      2. response similarity
      3. re-pairing

*Indicates the variables studied
**Multiple asterisks indicate the number of studies using that variable